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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/857,606	Applicant(s) DAHLBACK ET AL.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13,22,23 and 35-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 13,22,23 and 35-40 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Status

1. In view of the Remand by the Board of Appeals based on the conditions of 37 CFR 41.39(b)(2), such that the Brief filed on 14 April 2006 should have been considered a request to reopen prosecution, this Office Action treats that Brief as a reply under 37 CFR 1.111 to the outstanding Final Rejection mailed on 21 June 2005.
2. Secondly, the Board of Appeals has requested that the rejections in this Application be reviewed in light of two recent decisions, *Perricone* and *Atofina*. Due to the differences in facts sets between the present application and the *Perricone* and *Atofina* cases, the Examiner stands behind the 102 rejections. However, in the interest of allowing for different interpretations of the term "sufficient specificity", a new rejection ground is being entered for claims 13 and 35 under 35 USC 103, based solely on Mardon et al.
3. Applicant's attention is directed to ensure that the 5th Revision of the 8th Edition of the MPEP (released in August 2006) is the most current and up-to-date version of the MPEP and included substantial changes over the previous revisions to sections 2131.03 and 2144.05.
4. Additionally, as noted below, the declaration under 37 CFR 1.132 filed on 14 April 2006 is persuasive with respect to the rejection grounds of claim 38. However, new art has been found to reject this claim.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 13, 22 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification only provides support for the range of O being 500-1600 ppm. Thus, the range presently claimed is not fully supported in the specification as filed.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 13 and 35 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Mardon et al (US 5,023,048).

Mardon et al anticipate the invention as claimed. Mardon et al teach (see abstract) a Zr-alloy used as a cladding tube for nuclear fuel that contains 0.35-0.65 wt% Sn, 0.20-0.65 wt% Fe and 0.35-0.65 wt% Nb. This composition overlaps the presently claimed range at 0.65 wt% Sn, 0.3-0.6 wt% Fe and at 0.65 wt% Nb. The alloy further contains 900-1600 ppm O. See MPEP 2131.03. The Examiner regards the alloy composition of Mardon et al to be disclosed with sufficient specificity to be anticipatory

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at the end points of the claimed ranges of Sn and Nb. Alloy compositions are quite specific, leaving no doubt as to what composition is disclosed or claimed, particularly in view of the limited number of elements present within the composition at issue. Since Si is not intentionally added to the alloy of Mardon et al, one of ordinary skill in the art would have expected the alloy to inherently contain only an impurity amount.

Regarding claim 35, Mardon et al teach the alloy as claimed. Since the Si is only optionally present, its presence is not required. Thus, Mardon et al teach the composition.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 13 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardon et al (US 5,023,048).

As noted above, the interpretation of whether or not the alloy composition of Mardon et al was disclosed with "sufficient specificity" to be anticipatory is in question.

Thus, even if the disclosure Mardon et al is not considered to be "sufficiently specific" to anticipate the presently claimed ranges, one of ordinary skill in the art would have found, under the guidelines set forth in MPEP 2144.05, that the composition set forth by Mardon et al, which overlaps the claimed composition at 0.65 wt% Nb, 0.3-0.6 wt% Fe and at 0.65 wt% Sn, is sufficient to establish a *prima facie* case of obviousness. Applicant has failed to provide a full showing of unexpected results showing that the presently claimed range provides an unexpected result over the ranges of Mardon et al.

12. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mardon et al (US 5,023,048) in view of Mardon et al (US 5,373,541).

The teachings of Mardon et al '048 are described above.

However, Mardon et al '048 do not teach including Si at 50-120 ppm.

Mardon et al '541 teach (see abstract) a similar zirconium-based alloy for fuel claddings (see col. 2, lines 16-34 and col. 4, lines 43-48) that contains up to 200 ppm Si for the purpose of improved resistance to general corrosion.

Therefore, it would have been obvious to one of ordinary skill in the art to have added up to 200 ppm Si as taught by Mardon et al '541 to the alloy of Mardon et al '048 because the Si addition would improve the resistance of the alloy to general corrosion.

13. Claims 22, 23, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardon et al (US 5,023,048) in view of van Swam (US 5,790,623).

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Mardon et al teach (see col 2, lines 55-59) that the inner tubular layer (see Figure) is made of a Zr-alloy of conventional type such as zircaloy-4.

However, Mardon et al do not expressly teach that the cladding tube included an inner layer that was (1) more ductile than the cladding tube alloy and (2) the more ductile layer was made from a Zr alloy with less than 0.5 wt% alloying elements.

Van Swam teaches (see col 7, lines 45-49 and Figure 2B) cladding tubes for nuclear fuel rods, particularly multi-layered tubes. The innermost layer was either pure Zr or a Zr-0.4Fe alloy. These alloy layers provided protection against the cladding tube interacting with the nuclear fuel.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the inner protective layer of pure Zr or Zr-0.4Fe as taught by van Swam to the inner circumference of the cladding tube of Mardon et al because the inner protective layer of pure Zr or Zr-0.4Fe operated to provide protection against interactions between the cladding tube and the nuclear fuel rod.

With respect to the fact that the inner protective layer had more ductility than the ductility of the alloy, the inner protective layer of van Swam is identical to the instantly disclosed protective layer. Thus, one of ordinary skill in the art would have expected the inner protective layer to have the ductility as claimed.

14. Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mardon et al (US 5,023,048) in view of Mardon et al (US 5,373,541) as applied above to claim 38, and further in view of van Swam (US 5,790,623).

Mardon et al '048 teach (see col 2, lines 55-59) that the inner tubular layer (see Figure) is made of a Zr-alloy of conventional type such as zircaloy-4.

However, Mardon et al '048 do not expressly teach that the cladding tube included an inner layer that was (1) more ductile than the cladding tube alloy and (2) the more ductile layer was made from a Zr alloy with less than 0.5 wt% alloying elements.

Van Swam teaches (see col 7, lines 45-49 and Figure 2B) cladding tubes for nuclear fuel rods, particularly multi-layered tubes. The innermost layer was either pure Zr or a Zr-0.4Fe alloy. These alloy layers provided protection against the cladding tube interacting with the nuclear fuel.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the inner protective layer of pure Zr or Zr-0.4Fe as taught by van Swam to the inner circumference of the cladding tube of Mardon et al '048 because the inner protective layer of pure Zr or Zr-0.4Fe operated to provide protection against interactions between the cladding tube and the nuclear fuel rod.

With respect to the fact that the inner protective layer had more ductility than the ductility of the alloy, the inner protective layer of van Swam is identical to the instantly disclosed protective layer. Thus, one of ordinary skill in the art would have expected the inner protective layer to have the ductility as claimed.

Response to Arguments

15. Applicant's arguments filed 14 April 2006 have been fully considered but they are not persuasive. Applicant has argued that:

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- a. The specification states that oxygen was present at small amounts, and thus, fully supports the claimed range of “up to 1600 ppm O”.

In response, the Examiner disagrees. The specification indicates that there are impurities in the alloy, but that they should be kept below a certain maximum allowable amount. However, the disclosure of O was outside of that of the impurities, as indicated by the fact that Appellant’s specification states “It should however be noted that small amounts of impurities may exist in the alloy. ... Furthermore, small amounts of Si and O may exist in the alloy.” This indicates that the amounts of Si and O added are not impurity levels and that they are intentional additions to the alloy. Hence, one of ordinary skill in the art would not consider an O range of “up to 1600 ppm” being fully supported by the specification as filed. The only range of O supported by the specification is 500-1600 ppm.

- b. The claims are directed to a cladding tube, which requires that the portion of the tube made from the alloy be more than 50% of the thickness of the tube.

In response, Applicant has attempted to give the term “cladding tube” a special definition to mean the part of a nuclear fuel cladding which has the greatest thickness. However, the specification does not support such a special definition. Thus, the Examiner must give the claims their broadest reasonable interpretation. A cladding tube is any tube shaped object which surrounds a cylindrical object. Hence, Mardon et al meets the claim limitation of being a cladding tube. Alternatively, the transitional claim language “being made from” has not been given a special definition, and, thus, is treating as being open claim language, which is to be treated similarly to “comprising”,

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in which case Mardon et al would still anticipate the claim. Even if the transitional phrase "being made from" were treated similarly to "consisting essentially of", Appellant has not demonstrated that the interior layer of Mardon et al would materially affect the novel characteristics of the claimed cladding tube. Further, "being made from" cannot mean "consisting of", since further dependent claims require an inner surface layer, which would mean that the cladding tube did not consist of only the claimed alloy composition. In conclusion, if the term "cladding tube" is to be construed in the manner in which Appellant argues, where is the proof of such definition? The Examiner would assume that if the definition were so clear cut as Appellant argues, Appellant would easily have found any sort of literature or patent setting forth the specific definition. However, no evidence as to the argued specific definition of the term "cladding tube" has been provided. As such, the Examiner can only assume that "cladding tube" does not have the asserted special definition.

- c. Mardon et al merely teaches end points that touch the claimed ranges, not the full scope of the claimed ranges and therefore does not anticipate nor obviate the claimed invention due to a showing of unexpected results.

In response, the Examiner does not find this argument persuasive. In MPEP 2131.03, the requirement for anticipation if end points of a range are touching is that the prior art teach the range with "sufficient specificity". In the case of metal alloys, especially with an alloy with so few components, a clearly disclosed range with end points clearly explains to one of ordinary skill in the art what the ranges of the alloy are, and thus, is disclosed with "sufficient specificity". This rejection is made regardless of

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the preferred embodiments disclosed in the prior art, as the teachings of the prior art should not be construed as being limited only to the specific, preferred embodiments disclosed.

d. Van Swam teach away from the combination with Mardon et al because van Swam teaches that duplex cladding tubes, such as those embodied by Mardon et al, were not sufficient.

In response, in view of the teachings of both van Swam and Mardon et al, one of ordinary skill in the art would have been capable of combining the teachings to achieve the presently claimed invention. Van Swam clearly suggests including a "high" ductility alloy adjacent the fuel rod for improving performance. Therefore, one of ordinary skill in the art would have been motivated to use a "high" ductility alloy as the inner layer of Mardon et al for improving performance of the fuel rod cladding.

Response to Amendment

16. The declarations under 37 CFR 1.132 filed 31 May 2005 (corrected version of declaration filed 22 June 2004) and 14 April 2006 are insufficient to overcome the rejection of claims 13 and 35 based upon Mardon et al as set forth in the last Office action because: Applicant has not shown unexpected results commensurate in scope with the presently claimed invention, nor has the comparison data compared the closest prior art. Specifically, the ranges of Nb and Sn are at issue. Applicant's comparison data show that at (1) 1.0 wt% Nb and 0.3 wt% Sn and (2) 2.0 wt% Nb and 0.3 wt% Sn, neither of which is within the claimed range of Mardon et al, unacceptable lifetime is achieved. However, it is also noted that at 1.5 wt% Nb and 0.5 wt% Sn, acceptable

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lifetime is achieved. Thus, Applicant has failed to show that the claimed invention provided an unexpected result over an alloy selected from the ranges of Mardon et al. With respect to section II of the first declaration, Applicant has shown that values of Sn concentration below the range disclosed by Mardon et al have different properties than the presently claimed alloy. Thus, Applicant has not shown that the presently claimed provided an unexpected result over the alloy of Mardon et al. The comparison results in the second declaration are comparable, in that they do not compare the alloy taught by Mardon et al with the presently claimed ranges.

17. The declaration under 37 CFR 1.132 filed 14 April 2006 is sufficient to overcome the rejection of claims 38-40 based upon Garde et al since Applicant has demonstrated that the motivation for combining the teachings of Garde et al would not have been applicable for a Zr-alloy not containing Ni. However, new rejection grounds are presented for these claims utilizing Mardon et al (US 5,373,541) for a teaching of including small amounts of Si for improving corrosion resistance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw